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Carotid Stenting versus Carotid Endarterectomy: Evidence Basis and Cost Implications

Janssen M.P., de Borst G.J., Mali W.P.Th.M., Kappelle L.J., Moll F.L., Ackerstaff R.G.A., Rothwell P.M., Brown M.M., van Sambeek M.R., Buskens E. Eur J Vasc Endovasc Surg 2008;36:258-64.

Objective: Carotid Angioplasty combined with Stenting (CAS) is increasingly performed because of its presumed benefits. A study was performed to identify key factors that determine the cost-effectiveness as compared to conventional carotid endarterectomy (CEA).

Methods: The incremental cost-effectiveness of CAS over CEA for different scenarios was estimated using a modeling approach. Treatment costs were based on actual costs of successful procedures whereas costs of complications were taken from the literature. Patient survival was modeled using the endarterectomy patients from the ECST trial.

Results: Procedural costs of CAS are higher than those of CEA, mainly as a result of the high material costs. Cost-effectiveness of CAS primarily depends on major stroke rates. One percent increase in the peri-operative major stroke rate causes a cost increase of €1 051 and a loss of 0.06 quality adjusted life years.

Conclusions: At present CAS is at best non-inferior to CEA in terms of clinical outcome. Cost savings due to shorter admission are offset by the high costs associated with catheter-based interventions. At present CAS should be restricted to controlled settings until clinical trials have shown a substantial clinical benefit.

Multidimensional Characterization of Carotid Artery Stenosis Using CT Imaging: A Comparison with Ultrasound Grading and Peak Flow Measurement

van Prehn J., Muhs B.E., Pramanik B., Ollenschleger M., Rockman C.B., Cayne N.S., Adelman M.A., Jacobowitz G.R., Maldonado T.S. Eur J Vasc Endovasc Surg 2008;36:267-72.

Purpose: Clinical decision making for carotid surgery depends largely upon stenosis grade. While digital subtraction angiography remains the gold standard for stenosis grading, many physicians use less invasive modalities. The purpose of this study was to compare the results of multidimensional Computed tomography (CTA) with ultrasound (US) grading and peak flow velocity (PSV).

Methods: 37 stenosed carotid arteries were studied retrospectively in 36 consecutive patients. US grading and PSV were compared to multidimensional CTA analysis (diameter, area and volumetric measurements), performed by a medical software company. Calculations of stenosis percentage on CTA were made using the NASCET and ECST methodology. Diameter measurements were also performed by a neuroradiologist.

Results: All CTA diameter, area and volume measurements had only modest correlation with PSV ($r < 0.5$) and ultrasound grading ($p < 0.5$). There was concordant classification of stenosis grades in only 40–60% of cases. CTA diameter, area and volume measurements had good correlation ($0.69 < r < 0.87$) with one another using ECST methodology. Using NASCET methodology on CTA, correlation between diameter and area was insignificant ($r = 0.32$). CTA volumetric analysis with the NASCET method yielded 27 negative stenosis grades. Repeatability coefficient for selecting the normal distal ICA 20 mm more distally was 20% for diameter and 43% for area. CTA diameter interobserver repeatability coefficients were 22.9% (NASCET) and 17.8% (ECST) and 0.7 mm (lumen) and 1.9 mm (vessel).

Conclusions: All CTA measurements showed moderate correlation with both ultrasound grading and PSV. Selection of the level of the normal distal ICA influences the NASCET calculations and can produce discrepant stenosis grades. Multidimensional CTA analysis seems to have no additional value for stenosis grading, but provides other useful anatomic information.

Potential Circulating Biomarkers for Abdominal Aortic Aneurysm Expansion and Rupture - a Systematic Review

Urbonavicius S., Urbonaviciene G., Honoré B., Henneberg E.W., Vorum H., Lindholt J.S. Eur J Vasc Endovasc Surg 2008;36:273-80.

Background: The maximal diameter of abdominal aortic aneurysms (AAAs) is the dominating indication for repair. However half of the AAAs repaired would never have ruptured if left unrepaired, although small AAAs occasionally rupture. Earlier surgery may be associated with a lower mortality. More precise indicators for surgery are warranted. This systematic review identifies potential systemic biomarkers for AAA rupture or expansion.

Methods: MEDLINE/PubMed and EMBASE (from 1985 trough May 2007) were searched with the medical subject heading abdominal aortic aneurysm and keywords "size", "progression" or "growth" or "expansion rate" or "rupture" on the basis of MESH tree and as a text search restricted to English, German, French and Italian. In addition, reference lists were studied and manual searches performed. Observational studies investigating the association of circulating biomarkers with AAA rupture, expansion or size were selected.

Data extraction: Two reviewers (SU and GU) independently extracted the following data: year of publication, study characteristics, duration of follow-up, circulating biomarker, AAA expansion rate or size or rupture.

Results: 699 papers were identified. After exclusion of thoracic aneurysms and cardiac studies ($n = 118$), surgical or medical treatment studies ($n = 179$), case reports and animal studies ($n = 87$), as well as reviews or letters ($n = 66$), 249 articles were selected. Also excluded were 230 papers that did not report AAA size, expansion rate or rupture. 39 papers were included. Several potential biomarkers were identified. The strongest association with AAA was obtained with serum elastin peptides (SEP) and plasmin-antiplasmin (PAP) complexes. Matrix-degrading metalloproteinase 9 (MMP9) and interferon-gamma (IFN-gamma) could have clinical potential while many putative biomarkers showed poor association.

Conclusions: Several circulating agents in peripheral blood may predict AAA size, expansion rate or rupture. Few of them have clinical potential for future use. Confirmative studies and development of multivariate models are needed, together with continuing search for new biomarkers using the discovery based sciences within proteomics and/or genomics.

Abdominal Aortic Aneurysm and the Impact of Infectious Burden

Nyberg A., Skagius E., Englund E., Nilsson I., Ljungh Å., Henriksson A.E. Eur J Vasc Endovasc Surg 2008;36:292-6.

Objectives: Little is known about the biological processes causing aortic aneurysm rupture. Chronic *Chlamydophila pneumoniae* infection has been suggested as a possible contributing factor to the development and expansion of abdominal aortic aneurysm (AAA). The importance of infection in AAA may be related to the previous pathogen burden, that is, the number of significant titres of antibodies against infectious pathogens rather than to single infectious agents. The aim of this study was to examine the relationship between infectious burden and AAA rupture.

Methods: In a case-control study, 119 patients with abdominal aortic aneurysm and 36 matched controls without aneurysm were prospectively investigated for specific IgG class antibodies against *C. pneumoniae*, *Helicobacter pylori*, Cytomegalovirus, and *Herpes simplex* virus.

Results: Patients with ruptured AAA have similar levels of pathogen burden as patients with nonruptured electively operated AAA, small AAA, and controls without aneurysm.

Conclusion: The present study fails to demonstrate a connection between infectious burden and abdominal aortic aneurysm rupture.

Remote Endarterectomy for Long Segment Superficial Femoral Artery Occlusive Disease. A Systematic Review

Antoniou G.A., Koutsias S., Antoniou S.A., Giannoukas A.D. Eur J Vasc Endovasc Surg 2008;36:310-8.

Background: Remote endarterectomy is a minimally invasive procedure which combines open and endovascular surgery for the treatment of long segment superficial femoral artery (SFA) occlusive disease. We conducted a systematic review of the medical literature to analyze the indications, technical limitations and the outcome of remote SFA endarterectomy (RSFAE).

Methods: The English literature was searched using the MEDLINE electronic database up to February 2008. We considered studies comprising at least 10 patients treated with RSFAE and reporting on the primary and/or secondary patency rates. Average primary and secondary patency rates were obtained by weighting the data of each study by the number of limbs treated.

Results: Our search identified 19 retrospective or prospective case series; no randomized controlled trials comparing RSFAE with another